M.Sc. Physics Examination

Semester – 4

Instrumentation (Phys-E401)

Paper Code 4754

Time – 2Hrs30Min APRIL – 2016 Total Marks – 70

Q-1	(a)	Explain a generalized measurement system with block diagram.	[5]
	(b)	Which are the basic characteristics of measuring devices? Explain Hysteresis in detail.	[5]
	(c)	How transducers are classified?	[4]

OR

Q-1	(a)	Explain construction and working of Linear Variable Differential Transformer (LVDT) in detail.	[5]
	(b)	What is Hall Effect? Explain Hall Effect devices in detail.	[5]
	(c)	Describe different digital transducers.	[4]
Q-2	(a)	List different types of electrical strain gauges? Explain wire gauges in detail.	[5]
	(b)	Explain the factors affecting strain measurements.	[5]
	(c)	Which are the materials used for strain gauges? Explain each in detail.	[4]

OR

Q-2	(a)	What is temperature compensation? Explain temperature compensated gauges.	[5]
	(b)	Explain the gauging techniques and other factors. Explain temperature effect in detail.	[5]
	(c)	Write applications of strain gauges.	[4]
Q-3	(a)	Explain Bellows in detail	[5]
	(b)	Explain ionization gauge in detail.	[5]
	(c)	Explain "U- tube" manometer in detail.	[4]

OR

Q-3	(a)	Explain diaphragm pressure transducers in detail.	[5]
	(b)	Explain McLeod gauge in detail.	[5]
	(c)	Explain Pirani gauge in detail.	[4]
Q-4	(a)	Explain Rosette gauge in detail.	[5]
	(b)	What voltage is generated from a crystal 8mm thick if 2 MPa ($2x10^6$ N/m^2) of pressure is applied and the crystal is (i) X-cut longitudinal Quartz Sv = 0.055 V m/N (ii) Barium titanate Sv = 0.011 V m/Nwhere Sv is the voltage sensitivity of material.	[5]
	(c)	Write a note on sensor architecture.	[4]

OR

Q-4	(a)	Explain capacitive differential pressure sensor along with its signal conditioning circuit in detail.	[5]
	(b)	Describe variable reluctance sensor.	[5]
	(c)	Write a note on Knudsen gauge.	[4]
Q-5	(a)	What is mechanical temperature sensor? Explain liquid-filled systems.	[5]
	(b)	Explain thermistors in detail.	[5]
	(c)	Explain optical pyrometer.	[4]

OR

Q-5	(a)	Explain solid-state sensors.	
	(b)	Explain thermocouples in detail.	[5]
	(c)	Explain RTDs in detail.	[5]
			[4]